AMENDMENTS TO THE SPECIFICATION:

Starting on Page 4 Line 10 through page 5 line 10: (Original Application.)

~~In one embodiment the present invention uses a novel method which is found in Grober, US 6,611,662 to make the stable platform autonomous and self correcting. Two sensor packages are used. The first is located on the vehicle or vessel and monitors high speed movement. A second sensor is a level type sensor which is placed upon the level platform. The bias and scale factor errors of sensor package A are corrected over time by the level type sensor package B on the stable platform. Another advantage in this embodiment is that the use of a level type sensor on the stable platform will create an artificial horizon that is level in relation to centrifugal forces whenever the vehicle is turning.~~

~~The effect on an occupant is that in a turn, the stable platform will "bank" in the proper direction so that the occupant feels as if they are on a level platform. This in turn keeps the inner ear fluid level. Without this banking effect, the centrifugal force of the turn will cause the inner ear fluid to seek the artificial horizon, which, if the occupant is maintained level, will introduce a sense of motion that is unwanted. This effect is clearly demonstrated in an airplane turn. If the aircraft does not bank in the turn, the occupants feel as if they are being thrown to the side of their seats. If the proper bank is applied, there is no occupant sensation that the aircraft is proceeding through a turn.~~

~~Eliminating motion sickness requires that the sense of motion be removed. Powell does not remove the sense of motion created by centrifugal forces which are an integral part of any moving environment.~~

~~The present invention automatically corrects to remove the effects of centrifugal forces. In addition the "banking" effect can be adjusted to act immediately or diminished to be hardly noticeable depending on the frequency with which the level sensor output is utilized in processing the stable platform position. A low frequency utilization will result in a slow correction or "bank" of the stable platform to the artificial horizon. A high frequency utilization will result in the stable platform being more consistent with the sensor's actual indicated horizon.~~

In one embodiment the present invention the stabilized payload platform is autonomous and self-correcting. Two sensor packages are used. Each sensor package comprises one or more sensors.

Sensor package A is located on the vehicle, vessel, or the stabilizing device at any location where sensor package A can sense the motion of the vehicle that the stabilized payload platform is stabilizing against.

Sensor package B is comprised of sensor means including at least one level sensor. Level sensors sense acceleration and can sense the vector of gravity, AKA, earth's gravity, of which the perpendicular visual reference is the horizon. The vector of gravity sensed by level sensors is further affected by additional acceleration forces operating on the sensor. The sum total of these accelerations acting on the sensor produce a result known as the vector of apparent gravity, or simply apparent gravity. Level sensors sense this sum total of accelerations or apparent gravity, of which the perpendicular visual reference can be seen in a carpenter's bubble level if it were attached to the sensor. Sensor package B is fixed to the device in any location where it can sense the orientation of the payload platform, or at any location where it can sense the vector of apparent gravity, and which the control system can then calculate the required reference to the orientation of the payload platform. In one embodiment this can be achieved through the use of encoders or potentiometers on the gimbal to measure the framework angles that can be used to calculate the relationship between the payload platform and the vector of apparent gravity. Another embodiment could use encoders on the motor to provide this set of relative relationships.

The bias and scale factor errors of sensor package A measuring vehicle motion, can be corrected over time by the use of level sensors. Level sensors provide the reference for the payload platform orientation to level, therefore using these two sensor packages makes the device autonomous and self correcting. Another advantage in this embodiment is that the level sensor will sense apparent gravity, which, as used in this patent, provides the vector for the orientation of the payload platform when the orientation solution is designed to keep the occupant feeling the equivalent of the equivalent of earth's gravity even when the vehicle or platform experiences additional accelerations such as when the vehicle is speeding up, slowing down, or turning. The application of the apparent gravity effect on a occupant or payload is that in a turn, the stabilized payload platform will "bank" or orient itself so that the occupant feels as if they are level with the earth's gravity such as if they were sitting, standing or lying still. Without this banking effect, the apparent gravity exhibited such as in turns, will cause the occupant to feel as if gravity were pulling them out of their seat. This effect is demonstrated in an airplane turn wherein the aircraft does not bank or orient itself properly. The occupants feel as if they are being thrown to the side of their seats. If the proper bank or orientation is applied, there is no occupant sensation that the aircraft is proceeding through a turn because the occupant stays positioned relative to the apparent gravity vector.

Wherein eliminating motion sickness requires that the sense of motion be removed, the present invention can automatically orient to remove the effects of acceleration forces by banking or orienting the payload platform to counter the sensations induced by acceleration forces. In addition, the use of the two sensor packages, one measuring vehicle motion and the other measuring apparent gravity, coupled with the control system means to provide a payload platform orientation solution, and which can include a variable hardware control such as a potentiometer, software control, and which can be adjusted to position or orient the payload platform relative to the apparent gravity horizon, orient relative to the earth's horizon, or orient relative to variations in between.

The stabilized payload platform's orientation, based upon either the apparent gravity vector, the earth's gravity vector, or variations or combinations in between, can be varied in one embodiment by applying algorithms to the relationship between the utilization of sensor package A data and sensor package B data. The relationship between the sensor packages includes any methods for achieving relative relationships between the sensor's data contribution to the payload platform's orientation solution and can include relationships including sensor voltages,

bandwidths, filters or other methods. In one embodiment's orientation solution, if the vehicle motion data of sensor package A is more heavily weighted or greater relative to the level sensor data provided by sensor package B, then the stabilized payload platform will more closely orient to the vehicle's motion, which if it started level with the earth's horizon, would maintain level with the earth's horizon except for bias, drift or other errors including in the vehicle motion sensing package. If the vehicle motion data of sensor package A is less heavily weighted or less relative to the level sensor data of sensor package B, then the stabilized payload platform will more closely orient to the apparent gravity that is being exhibited upon the invention.

The stabilizing system may comprise means, such as a control system with its software or hardware, and control algorithms, to provide orientation solutions for stabilizing the payload platform to the absolutes of the earth's horizon and apparent gravity horizon, to the range of positions or orientations relative to or in between the earth's horizon and apparent gravity horizon.

The stabilizing system having the means to orient the stabilized payload platform to one or more stabilized orientations, includes any stabilizing system to which means can be incorporated to orient the payload platform to or relative to the earth's horizon, the apparent gravity horizon, or a range of orientations between the earth's horizon and the apparent gravity horizon.

These solutions include but are not limited to the use of analog devices such as variable potentiometers to adjust the relative input of sensor package A to sensor package B which then affects the payload platform's orientation. Wherein increasing the value of sensor package A relative to the value of sensor package B will increasingly orient the payload platform to the motion of the vehicle or moving object to which the device is attached, increasing the value of sensor package B relative to the value of sensor package A will increasingly orient the payload platform to the apparent gravity horizon. A software solution may also be invoked wherein an algorithm may be written to reflect the equivalent that when the value of sensor package A is increased relative to the value of sensor package B, the payload platform will increasingly orient to the motion of the vehicle or moving object to which the device is attached, and increasing the value of sensor package B relative to the value of sensor package A will increasingly orient the payload platform to the apparent gravity horizon.

The speed of stabilization or actuation, which can also be the response speed by the

drive mechanism(s) orienting the payload platform, includes the payload platform response delay or anticipation of vehicle motion, as well as other attributes for the horizontal and azimuth angle of the payload platform.

The on/off controls for the device are also attributes that can be controlled by an operator which may be an occupant, a non occupant operator, a computer or control system.

In one embodiment the control system is comprised of at least one computer that has software or hardware that can be configured to process the data from sensor package A and sensor package B and compute the payload platform orientation solution to stabilize relative to the earth's horizon or stabilize relative to the apparent gravity horizon.

In another embodiment, the control system can also compute various stabilized platform orientations in between the orientation relative to the gravity vector, and relative to the apparent gravity vector. In another embodiment the means to do this consists of software, hardware, or a combination of both, which can bias sensor package A data in relation to sensor package B data or visa-versa. Another embodiment may comprise a potentiometer to change the gain of one sensor package in relation to another sensor package in order to obtain a stabilized payload platform orientation that can be varied. Means may also be employed, such as a computer, joystick or potentiometers to provide active or continually changing variables of the orientation relative to the outputs of sensor package A and sensor package B.

In any embodiment, the individual sensors comprising a sensor package may be located at different locations and not in the same physical sensor package. For instance, the sensors that sense the motion of the vehicle may be located on or relative to each of the drive mechanism's axis in order to sense rotation about that axis. In this case the sensors comprising that package, work to perform a unified function but are not in the same physical package.

The stabilized payload platform is the platform upon which occupants, payloads or other objects can be placed or attached. It is a rigid construction of one or more pieces, or a group of pieces that comprise any structure(s) that are stabilized from the motion of the vehicle or moving object to which the invention is attached.

The invention can stabilize in up to three axes including pitch, roll and yaw. This three axes set can be a reference relative to the earth's horizon or the three axes of the device itself and will be determined by the language of the claim. The yaw axis can also be referred to as the azimuth or as a compass heading. The device can maintain an azimuth orientation relative to a compass heading, an object, or other heading. Additional actuators can be added that will also

stabilize the payload platform in one or more linear axes and which may include such devices as linear actuators or springs to reduce or eliminate shock and vibrations.

The "vector of gravity" is the vector that describes the acceleration force of gravity, and which runs through the center of the earth.

The "vector of apparent gravity" is the sum total of all accelerations acting on an object. If that object is a level sensor, it will sense the vector of apparent gravity and indicate a horizon perpendicular to the sum of the acceleration forces to which it is subjected.

The term "earth's horizon" is the same or equivalent to what is normally referred to as the horizon line or the two dimensional plane perpendicular to the vector of gravity.

The "apparent gravity horizon" is the same or equivalent to a horizon line or two dimensional plane perpendicular to the vector of apparent gravity.

The term "sensing motion about at least two axes" includes sensing at least one of rotational or linear motions along the specified axis.